

**REMARKS****Claim Amendments**

Claim 1 has been amended to add the limitation “water soluble” to the hematin catalyst. Support may be found in the application as filed on page 4, line 4.

No new matter is added by this amendment.

**Applicants' Invention and Advantages**

Applicants' invention is a method of polymerizing an aromatic monomer, comprising combining an aromatic monomer with a water soluble hematin catalyst, wherein the hematin catalyst is derivatized with one or more non-proteinaceous amphipathic groups.

The derivatized hematin of the present invention can be completely water soluble and recyclable, which virtually eliminates the need for toxic reagents and solvents, and thus creates an environmentally friendly synthesis for polyaromatic polymers.

The water solubility of the derivatized hematin resolves one of the primary limitations of catalysts currently used in the commercial synthesis of polyaromatic polymers, namely by providing a catalyst that is active and stable over a wide range of pHs. In contrast, conventional, underivatized hematin generally is poorly soluble in acidic solutions, and consequently has a relatively low catalytic rate in acidic solutions.

Moreover, the derivatized hematin of the present invention, in combination with a template, reduce the amount of branching during polymerization of polyaromatic polymers, leading to a structurally more consistent product.

**Rejection of Claims 1-5 Under 35 U.S.C. 103(a)**

The Examiner rejects Claims 1-19 under 35 U.S.C. § 103(a) as being unpatentable over Akkara, J.A., *et al.*, “Hematin-Catalyzed Polymerization of Phenol Compounds,” *Macromolecules* 33:2377-2382 (2000) in view of Przybycien, *et al.*, U.S. Patent No. 5,711,867. The Examiner asserts that “one of ordinary skill in the art would be motivated to polymerize the aromatic monomer as disclosed in Akkara employing a hematin derivative, as disclosed in Przybycien, in order to gain the advantages of the combination of the references, that being

electrochemical separation in which metalloporphyrins and metallophthalocyanines are utilized as the stationary phase."

However, Claim 1, as amended, is nonobvious in view of Akkara and Przybycien, taken either alone or in combination.

Applicants' invention is a method of polymerizing an aromatic monomer, comprising combining an aromatic monomer with a *water soluble* hematin catalyst derivatized with one or more non-proteinaceous amphipathic groups (Claim 1, as amended).

By contrast, central to Przybycien's teaching of electrochemical separation is that the metalloporphyrins and metallophthalocyanines are employed in an immobilized, *insoluble* form (column 3, line 66 to column 4, line 17):

The present invention exploits the physical and chemical properties of electrochemical groups having stable redox states, e.g. metalloporphyrins and metallophthalocyanines [...] When the electroactive coordination compounds are *immobilized onto a conductive insoluble support* or matrix, the compounds can be electrochemically reduced or oxidized as desired in situ. This advance enables superior versatility and control over surface-adsorbent interactions resulting in selective, tunable binding strengths which can alter the behavior of the binding system including a reversible "release" of the bound material without physically changing either the mobile phase or stationary phase composition during elution. [Emphasis added]

Therefore, not only does Przybycien *teach away* from the desirability of the claimed *water soluble*, derivatized hematin catalyst, it should be apparent to one of ordinary skill in the art that the electrochemical chromatographic separation of Przybycien requires the metalloporphyrins and metallophthalocyanines to be *immobilized onto a conductive insoluble support*.

The Examiner states that Akkara discloses a method of polymerizing an aromatic monomer by combining phenol compounds with hematin using a peroxide initiator. The Examiner correctly states that Akkara does not disclose a hematin catalyst derivatized with one or more non-proteinaceous amphipathic groups nor the use of any template, i.e., the Examiner acknowledges that *Akkara does not disclose the water soluble, derivatized hematin catalyst of instant Claim 1*.

In addition, there is no motivation to combine Akkara and Przybycien to employ the *water soluble*, derivatized hematin catalyst of Claim 1 because, *inter alia*, by doing so, the advantage of separation afforded by Przybycien is lost. Therefore, the combination of Akkara and Przybycien teaches away from the desirability of Applicants' claimed invention.

Moreover, as such, the cited references do not teach the advantages Applicants' claimed invention. There is no disclosure or suggestion in either Akkara or Przybycien to combine the teachings of these references to thereby obtain Applicants' claimed invention.

Therefore, the invention of Claim 1 (and dependent Claims 2-19) is nonobvious under 35 U.S.C. § 103(a) over Akkara and Przybycien, either alone or in combination. Applicants respectfully request that the rejection be withdrawn.

**CONCLUSION**

Claim 1 has been amended to recite that the derivatized hematin compound is water soluble. There is no teaching of Applicants' claimed invention in Akkara or Przybycien, either alone or in combination. Therefore, Applicants' invention meets the requirements of 35 U.S.C. § 103.

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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Dated:

3/7/05